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HISTORICAL ASPECTS OF DIABETES AND INSULIN

If we conceive of an unsolved problem as an object of vague configuration, overlapping the center of a circle, then it is obvious that around the circumference of this circle an infinity of viewpoints is possible for the investigators. If each investigator insists on glueing his eyes to his particular peep-hole and does not shift his viewpoint from time to time, there will be a perfect welter of discordant views and theories, and no progress will be made. But as a large number of peep-holes on any small arc of the circumference (or the chord subtending it) give practically the same view of the object, the chances of getting some real knowledge of its inward nature lie in selecting an advantageous viewpoint; while generalization or synthesis from a fusion of all the viewpoints, as in a composite photograph, is of enormous advantage from time to time. This fact is at the bottom of all the violent controversies which have disgraced medical theorizing in the past and have given medicine a lower status than the so-called exact sciences.

In nothing is this fallibility of human reasoning more strikingly displayed than in the history of the disease called diabetes. It was known from the earliest times and its principal symptoms were clearly recognized by the Greeks, the Hindus and the Arabians. The polyuria is mentioned in the Ebers Papyrus, the sweet taste of the urine (*madumeha*), the thirst, foul breath and general languor were long known to the ancient Hindus and this knowledge was probably transmitted by them to the Arabs. Celsus noted the emaciation attending the polyuria, Aretaeus described it as "a melting down of the flesh and limbs into urine," noted the constant thirst and urination, the fatal end-

ing, and called the disease διαβήτης (siphon), because the water intake is immediately siphoned out of the body. Avicenna noted, in addition to the thirst, polyuria and emaciation, the muscular, mental and sexual impotence, the general listlessness, and likened the effect of the water intake on the kidneys to dilatation of the stomach from excessive ingestion of solid food. His prescription—fenugreec, semen contra and hops—was tried on five patients, with some success, by Professor Albert Robin (Paris) in 1913. On the descriptive and empirical side, little could be added to Avicenna's account of the disease.

With Galen the period of speculation set in. Galen, Ætius, Alexander Trallianus and Avicenna centered the disease in the kidneys, Paracelsus and Franciscus Sylvius regarded it as a chemical disorder of the blood, Zacütus Lusitanus and later John Rollo thought the stomach the seat of the trouble. Sydenham saw it as a digestive disorder, Morton as a tabes or wasting disease, Cullen as a neurosis. Mead, like Claude Bernard, sought the site of disease in the liver. The metabolists of later times have produced a succession of dissolving views on infant nutrition and diabetes which Ruhräh has likened to the approaches of Saxe's "Six Blind Men" to the elephant. Even von Noorden, who hit upon the oatmeal diet, maintained that diabetes is due to the presence of β-oxybutyric acid in the system.

Much was learned from the mere geographical distribution of the disease. The widespread belief that it does not occur in the Orient or in the tropics had been already confuted by the Hindu and Arabian physicians. Jews, certain Hindus, and Maltese are particularly exposed to it, as also the Chinese, Japanese and Siamese who have taken to European foods and sweet wines. Medical officers in India call it "the gout of the Bengali"; yet Fijians, Papuans and West Indians, who feed upon sugar cane and yams, are no more exposed to it than the Jewesses of Tunis, fattened upon fenugreec. In 1907 the mortality from diabetes was highest in Worcester, Mass. (27.3 per 100,000), Bordeaux, the great wine center of France (25.8), Syracuse, N. Y. (25.7), Rochester, N. Y. (21.6), Berlin (20), San Francisco (20), while Boston, New York and Washington all had a mortality rate above 17. Yet, considering the high relative mortality of Jews in

Frankfurt, Berlin, Prague and Buda Pest, or its incidence in tropical countries, even these figures suggest that the cause is to be sought in some peculiar chemical adjustment of the patient's body to the particular diet used.

The observant clinician, Willis (1674), did much for the diagnosis of diabetes, by locating the sweet taste of the urine as a differential sign. Yet it was nearly a hundred years later that Johan Peter Frank (1794) defined and named the two forms, diabetes insipidus (spurius) and diabetes mellitus (verus). In 1815 the chemist Chevreul showed that the sugar eliminated in diabetes mellitus is grape-sugar (glucose, dextrose), which Tiedemann and Gmelin found normally secreted in the intestines (1821). Sugar in the blood of diabetics had been noted by Ambrosiani (1835) and others, but Magendie attached no importance to it, since traces are also found in normal blood.

The experimental or metabolic period begins with the great name of Claude Bernard, the founder of experimental medicine. In 1857 he established by his experiments the doctrine of the liver as the sugar-making plant in diabetes (glycogenic function), and isolated glycogen, which he regarded as a true internal secretion. In 1849 he produced a temporary diabetes in dogs by a puncture in the fourth ventricle. It has been well said that even the mistakes of great men are more instructive and productive than the findings of lesser men. The glycogenic theory was vigorously assailed by Pavy, who maintained that the excess of sugar found by Bernard in the liver was due to post mortem change and that sugar is decomposed in the intestines and reaches the liver only when in excess. Similar views were upheld by Schiff, Pflüger, von Mering and others; but the interest of Bernard's work is that he established the doctrine of internal secretions, namely, that the various organs of the body are not tied down to isolated functions, but may have several interrelated functions, among them the discharge of special chemical substances into the blood-current instead of into the external world. Glycogen may not be a true internal secretion and experimental diabetes may be produced by puncturing regions other than the fourth ventricle; but all that is contained in Cushing's findings on pituitary (insipid) diabetes and Banting's isolation of insulin is implicit in

the work of Claude Bernard. Bernard had himself noted a case of pancreatic atrophy, in one of his diabetic autopsies. The clinician Frerichs found nine such lesions in his post mortem work (1862). In 1869, Paul Langerhans found in the pancreas an insulated group of special cells, now known as the islands of Langerhans. Many instances of pancreatic atrophy were found in diabetics thereafter and by 1878 the clinician Lancereaux was advancing the doctrine of the identity of pancreatic diabetes with the classical emaciated form (diabète maigre). By 1889, von Mering and Minkowski had reproduced this classical type in animals by complete excision of the pancreas, and further experiments of Laguesse (1893) demonstrated that this sugar-regulating function of the pancreas is probably due to an internal secretion evolving from the islands of Langerhans. In 1901, Opie established the fact that pancreatic diabetes is associated with hyaline degeneration of the islands of Langerhans, which was confirmed by Ssoboleff (1902), McCallum (1909) and others. Thereafter considerable experimentation was concentrated upon isolating the hypothetical internal secretion of the pancreas; but up to the time of Banting, general attention was diverted from this problem by newer complexities of the subject. Petters had discovered acetone in diabetic urine in 1857; Carl Gerhardt isolated aceto-acetic ether from acetonaemic urine in 1865; Stadelmann found β-oxybutyric acid in the urine of diabetic patients suffering from the acetonaemic coma with air hunger (described by Kussmaul 1874); and von Mering produced experimental diabetes by ingestion of phlorizin (1886). All this produced a vast amount of experimenting and theorizing relative to metabolism in diabetes and its treatment by various dietetic schemes. It was found that glycosuria or lowered tolerance for carbohydrates may be produced by goitre, by the injection of thyroid extract in acromegaly, by injection of pituitary extract, by excision of the parathyroid gland or by injection of adrenalin; and that glycosuria will supervene upon excision of the pancreas even after excision of the thyroid and parathyroid, but not after excision of the suprarenal glands. The Viennese clinicians, Eppinger, Falta and Rüdinger, came to view the chromaffinic system (thyroid, pituitary and suprarenal glands) as mobilizers of carbo-

hydrates and accelerators of glycosuria, in that all three increase protein metabolism, while the adrenals mobilize carbohydrates and the thyroid increases fat-absorption. On the other hand, the pancreas (islets of Langerhans) and the parathyroids inhibit glycosuria by retarding protein metabolism and inhibiting carbohydrate mobilization. Diabetes and obesity are thus, in a manner, logical opposites. Diabetes following excision of the pancreas is held to be due to the mobilizing power of the adrenal secretion on carbohydrates, the inhibitory effect of the pancreatic secretion being removed. In other words, a positive adrenal diabetes (glycosuria following injection of adrenalin) is equivalent to a negative pancreatic diabetes (glycosuria following excision of the pancreas). Goitre tends to produce glycosuria by relative pancreatic insufficiency and increased adrenal activity. In 1902, Magnus and Schäfer produced polyuria in animals by injection of pituitary extract. Schäfer and Herring, in 1916, showed that this diuretic principle is located in the pars intermedia of the gland. Cushing and his pupils in 1908–12 produced pronounced polyuria of several days duration by surgical manipulation of the pituitary. Cushing's inference is that diabetes insipidus is due to pituitary insufficiency. The net result of the complex studies on the metabolism and dietetic treatment of diabetes was to establish the fact that diabetes is not caused by excessive sugar production but by the inability of people of a certain chemical make-up to oxidize it (Murlin). The tests are Lusk's D. N. ratio (3.65 glucose: 1 nitrogen) in the urine; Magnus Levy's respiratory quotient (0.69) as an index of exaggerated heat production from increased protein metabolism, and the blood-sugar level, standardized by Benedict, Folin and others. The acidosis is the effect of excretion of acids and corresponding destruction of alkali reserve by failure to oxidize certain fatty and amino-acids.

The classical experiment of von Mering and Minkowski (1889) was the starting point in the discovery of insulin. Prior to this time, Arnozan and Vaillard had found that ligation of Wirsung's duct will cause the pancreas to atrophy (1884). Successful attempts to lower sugar excretion by administration of pancreatic extract were made by Caparelli (1892), Ballistini (1893), Sibley (1893), Ralfe (1893), Ausset (1895), Bormann (1895), Vanni

and Burzagli (1895), with failures by Minkowski and others. These experiments were abandoned because of febrile and other toxic effects. Zuelzer got favorable results in five cases (1908) but gave up the work for the same reason. The technique of making alcoholic extracts was vastly improved by Scott (1912) and by Murlin (1913), whose valuable work was unfortunately interrupted by war service. In 1920, Barron pointed out the similarity between the pancreatic degeneration resulting from ligation of the ducts and from blockage of the ducts by gallstones. Acting upon this hint and upon Laguesse's theorem that essential diabetes is an insular lesion, Banting and Best found that administration of extract of a pancreas degenerated by backing up of trypsin through ligation of the pancreatic duct will cause an immediate cessation of glycosuria and hyperglycaemia in depancreatized dogs, Scott's method of extraction was then improved so that a concentrated extract was obtained, which was successful in seven cases (February, 1922). In 1916, Schaefer had suggested the name *insulin* for the hypothetical hormone or active principle of the internal secretion from the islands of Langerhans. This name was applied to the standardized alcoholic extract. The general success, even in coma, needs no comment, but there were still bad effects in the earlier experiences, until the extract had been purified of toxic principles. Even so, this therapy requires cautious dosing and the effect of insulin upon all parts of the system needs careful study. The merit of the Canadian workers lies in their persistency in following up a clew. Murlin, who was close upon the discovery of insulin in 1917, has compared the approaches to insulin with the ascent of a mountain by a zigzag trail. It also illustrates the advantage of selecting the advantageous peep-hole or viewpoint. Murlin quotes Pasteur: "Chance favors only the properly prepared mind." Banting quotes Weir Mitchell's aphorism that the success in discovery comes only when the time is ripe for its reception. This receptive, sympathetic spirit favored Banting and his associates and even financed them. Helpful, too, were the bibliographical and historical records, which enabled the investigators, as they proceeded in their work, to avoid the mistakes made by their predecessors. While insulin deficiency causes diabetes, we

do not yet know the cause of this deficiency. To ascertain this will require some fusion of all the different viewpoints into a generalized concept of diabetes which, like a composite photograph, will give us a more definite notion of the inwardness of all deficiency and ductless gland diseases.

F. H. GARRISON

HEADACHES—THE NASAL ASPECT

ROSS HALL SKILLERN, Philadelphia

(Delivered before the New York Academy of Medicine, March 19, 1925)

The subject of headache resulting from nasal conditions, is such a wide one that to treat with it adequately in one evening's dissertation would to all intents and purposes be well nigh impossible, therefore with your permission, we will confine ourselves this evening to those head pains directly or indirectly associated with inflammatory conditions of one or more of the accessory sinuses connected with the nose.

The phenomena described as pain, or as we will term it tonight, headache, resulting from disturbed conditions within the para-nasal sinuses, varies so greatly in all its phases of manifestation as to constitute perhaps one of the most inconsistent and variable evidences in the domain of symptomatology; happily however, diagnostic clues of much importance may be gathered from this apparent confusion for, as the old adage has it "The exception proves the rule," so here the very inconstancy of the headache must bring to mind, certainly to the rhinologist and perhaps also to the astute internist, the probability of a nasal sinus involvement.

Before discussing the individual sinuses with their special characteristics, it might be well for a moment to consider the actual pathologic factor which gives rise to the subjective sensation of pain.

Headache, both as to character, degree and even time of appearance, depends largely upon the pathologic condition present within the sinus, the most important being some form of pres-

sure. This pressure may result in two ways. One, in which the lining mucosa of the sinus becomes so congested and swollen as to impinge on the lining mucosa of the opposite side, thus meeting and obliterating the sinus cavity or at least converting it into slit-like aperture; the other results when, from one cause or another, the drainage passages become more or less occluded, thus causing partial or complete stagnation within the sinus with resulting pressure on the already swollen and inflamed mucosa. A third form which I mention not so much on account of its importance, as for the sake of completeness, is the negative pressure or so-called vacuum headache. While this may play a certain role, nevertheless, I believe both its relative appearance, as well as importance, has been exaggerated, for as my experience advances it would appear that this type of headache is becoming less and less in evidence and certainly more and more difficult to prove to one's entire satisfaction.

The pain then is due to pressure exerted upon the nerve endings in the sinus mucous membrane associated probably with a certain toxicity liberated by the infecting micro-organism. We would then have both a mechanical as well as a toxic factor in the causation of this subjective phenomena known as headache.

Accepting this as true what then are its characteristics? Do we have a typical sinus head pain? Broadly speaking this can be answered in the affirmative, but with reservations. With the ordinary text book case of sinus disease, running a text book course, on questioning the patient regarding his headache, he would say "Yes, doctor, the pain comes on shortly after I arise and continues until one or two o'clock, then suddenly ceases and I am comfortable for the balance of the day." That is the typical sinus headache, but where one is typical, a dozen will be quite opposite so that unless it happens to be one of the variety adhering strictly to type, as far as periodicity is concerned, little reliance can be placed upon its diagnostic import.

What then, regarding the character of the pain, referring especially to its degree and type?

The character of the pain may be dull, splitting, semi-throbbing, throbbing and combined, the old sick headache of our boyhood days. All these depend upon the pathological process or

condition present in the sinus or sinuses at that particular moment. The presence of any one of these types has its own peculiar reason and one can accept with reasonable certainty that the severity of the pain is directly as to the congestion in the sinus and sinus mucosa. Thus, if the sickening, throbbing symptoms prevailed, one can rightly deduce that an acute period of passive congestion or rather an active congestion is at the moment in the process of being, while, should only a dull ache be present, either the acute process has subsided and is in a state of comparative quiescence or the infection is a mild one and has not greatly affected the sinus mucosa. Even this statement however, cannot be accepted at its apparent face value, but has its limitations as will be seen when we speak on the frontal sinus.

From the foregoing, it will be seen that in sinuology one endeavors to associate a given type of pain with a recognized pathological condition within the sinus, and one of the results of this is that certain obscure types of cephalgia are no longer being recognized, chronic nervous headache for example, is a term which is now rapidly becoming obsolete.

Another characteristic of the sinus headache is its peculiar intolerance toward alcohol and to some extent tobacco. I have often noted when a patient is fairly comfortable and decides that a hot drink before retiring (which some well wishing friend seems always to be in a position to supply) will benefit his condition, but he is invariably made much more uncomfortable. This is of course due to the congestion which it causes in the head, adding to the already swollen and inflamed mucosa in its becoming suffused to the point of engorgement.

One more point of importance is the subjective localization of the pain. In a given sinus infection the pain will always reoccur in the same place and while that sinus alone is involved it will remain constant. This holds good even during the acute exacerbations of the inflammation process, the pain of course reacting accordingly. If however, the infection spreads to a neighboring cavity the pain will then assume the characteristics pertaining to the latter as well as continuing in the old locality. This will be further elucidated when treating with the sphenoid.

Regarding the complete absence of pain in attacks of sinusitis that are worthy of the name, I am somewhat of a sceptic. Certain authors (notably Continentals) have reported such cases, but I have never met one in my own practice in which either pain or tenderness had not been present. The experiences of my own colleagues seem to bear me out in this matter. This of course refers to infections with suppuration and does not include those mild hyperplastic conditions which often affect the ethmoid.

Let us now apportion the head into areas corresponding to those usually affected by the individual sinuses.

The confinement of the pain within these specified areas as attributed to individual sinuses is not invariably accurate, but bases itself quite well for purposes of differentiation. For example, headache from frontal sinusitis is usually confined to the supra-orbital region, but may, in certain cases, extend well into the parietal area, a region usually dominated by the posterior ethmoid and sphenoid. Again the typical sphenoid head pain is in the occiput, yet I have seen cases where it was transmitted to a spot directly over the front of the maxillary sinus on that side. By and large however, we can accept the diagrammatic illustration as fairly illustrative of the typical head pains as caused from the different sinuses.

Let us now consider our subject from the standpoint of the individual sinuses. Only chronic infections being considered, as time is lacking and roughly speaking the acute infections, with the possible exception of the sphenoid, are more or less self evident.

The Maxillary Sinus

Paradoxical as it may seem the typical pain from an inflamed antrum is directly over the frontal sinus on the same side. This may be so severe and persistent as to simulate a frontal infection and indeed many a frontal sinus has been chiseled open and found to be healthy, on this very account, a circumstance which some time ago occurred in our city. One would expect in a case of sinusitis that no matter where the pain radiated, at least, it would be particularly marked over the limits of the sinus cavity and even if quiescent, could be elicited by means of pres-

sure or tapping. Only very exceptionally does this occur in chronic maxillary sinusitis. Occasionally during an acute exacerbation, the patient will complain of a feeling of pain in the antrum, but on close questioning it will be found that the sensation is not so much an ache as a feeling of distention or pressure. Tenderness on even deep pressure is not elicited.

The Frontal Sinus

Chronic inflammation of this cavity always seemed to me to be analogous to chronic appendicitis. The two run almost identical courses, periods of quiescence interspersed with acute exacerbations and no one ever knowing just when a flare up will occur and how serious it will be. Usual headache associated with this in the stage of quiescence depends considerably upon the size and extent of the sinus, but presuming the cavity of normal area and the infection not particularly virulent, the pain is of a dull character not quite sufficient to keep the patient confined to the house, but enough to seriously interfere with his business pursuits, particularly brain work, such as an accountant or bookkeeper. He will say "Doctor, this headache annoys me so I can't keep my mind on my work." In other words, he has lost the ability to keep the attention concentrated. The pain usually remits sometime during the afternoon often completely, but in bad cases seldom entirely. When an acute exacerbation occurs the headache augments corresponding to the swelling and consequent pressure that obtains within the sinus cavity. This is when we have those pains, which are of a splitting or throbbing character in which the reaction of the patient is one of intense suffering. The Austrians have an expression for these: "Wahnsininge Schmertzen" which is difficult to translate into iodomatic English, but I think describes them better than any other definition with which I am familiar. Indeed they may become so unbearable as to awaken in our weaker brethren suicidal tendencies. As the acuteness subsides the pain also recedes, until it reaches its lowest ebb, a degree of more or less relative comfort, which in that particular case may be considered normal.

Curious as it may seem, the pain may not necessarily be proportionately severe as to the duration of the disease. In other

words, it does not necessarily follow: The more chronic the disease, the greater the headache.

I recall particularly a young man who came into the hospital after a peculiarly severe attack of acute frontal sinusitis from deep diving. He presented himself for diagnostic purposes feeling much improved over his condition of the previous week and rather resented the idea of an operative procedure, but at the time of operation, at least half of the frontal lobe was covered by an extra dural abscess.

It is interesting to note that even beginning cerebral complicaitons need not necessarily be accompanied by severe local manifestations, particularly when the silent area of the brain is involved.

The Ethmoid

This structure is unlike the true sinuses, which represent cavities, situated *outside* of the nasal fossa, while the ethmoid labyrinth is a mass of cells of a spongy consistency, lying *within* the nasal chambers. Under these circumstances we can rightly presume that head pains from disease of this structure would be of a different character than those from the true sinuses, surrounded by hard unyielding bony walls. The ethmoid labyrinth is subject to two distinct forms of infection. Chronic hyperplastic with polyp formation and chronic suppurative. In both of these forms of the disease, headache is one of the most inconstant symptoms, the violence of the pain having apparently no relation to the severity of the disease. In certain cases the pain will be quite severe yet the actual pathological changes are insignificant, in others the headache is mild yet enormous tissue changes have taken place within the sinus. While a special treatise on the various ethmoidal headaches would require the two forms to be disassociated, however, in this instance lest we become too involved, it would be wise to consider them both under one heading. As noted in the diagram, headache from ethmoidal inflammation is felt particularly over the parietal regions. A dull pressure would perhaps describe it better than an actual pain. This of course varies at even different hours through the day and when marked, sometimes extends into the

temporal regions. In severe cases, even after the pain leaves, the scalp remains sensitive to pressure. As the infection is apt to be more advanced in one side of the ethmoid capsule, the pain will naturally be more pronounced on that side. Regarding a differentiation between the pain in the polypoid and suppurating varieties there is little to choose. Broadly speaking, however, one can say that in the hyperplastic type it is more constant, while in the suppurative, it is apt to be much more severe.

Another area of discomfort in ethmoidal infections is between the eyes directly above the root of the nose. The patients say there is a feeling as though a wedge were prying things apart and if they could only get their finger in there, they could pull it out. In other words, they can localize the seat of their pain within very small limits. This is by no means constant, but when present is pathognomonic.

The Sphenoid Sinus

Pain from this, the deepest lying sinus cavity in the cranium. is perhaps one of the most overlooked and yet significant, of all those head pains with which we are concerned. The headache usually associated with sphenoiditis of the chronic type is perhaps more typical than any of the others, possibly excepting the frontal. It presents itself as a diffuse feeling of pressure in the occiput, sometimes extending into the mastoid processes and even into the temporal region. Extension downward into the shoulder, of the affected side, the so-called spheno-palative syndrome, popularized by Sluder, is also not infrequently associated with this affection.

The degree and extent of the pain is concomitant with the amount of pressure within the sinus. As this pressure, except in extreme instances, is not constant, it naturally follows that the headache must occur in periodical attacks, the severity of which is dependent upon the degree and prolongation of the secretory pressure. This may be caused on the one hand, by the contained and continually forming secretion, and on the other by the approximation of the sides of the inflamed mucosa. Both of these forms may be exerted coincidently. As the pres-

sure is relieved, the pain remits in intensity, the remission being directly as to the length of time required for the passing of the congestion. During paroxysms or stage of retention, the cephalgia changes its character to an intense sickening and throbbing, synchronous with the heart beat, while during the stage of quiescence, it assumes more the character of a heavy pressure upon the vertex. The periodicity of recurrence is not typical as in the frontal, but seems to come on at any time of the day and does not remit with that abruptness as is so often noted with the latter.

Another curious phase of the pain is its occasional appearance directly below the eye, in the region of the infra-orbital nerve.

Dizziness, especially on stooping, is more frequently associated with pain from the sphenoidal sinus than from any of the others and when marked, is rather indicative of inflammatory disturbances within this cavity.

And now, Gentlemen, I am done. In conclusion, however, it would seem that headache is one of the most common of all the symptoms associated with a chronic sinusitis and that the time, place and degree of these head pains, properly interpreted, despite their vagaries, constitute one of the most reliable signs in the symptomatic diagnosis pertaining to sinuology.

OCULAR HEADACHES

G. E. de Schweinitz, Philadelphia

(Delivered before the New York Academy of Medicine, March 19, 1925)

Who first realized that head-pain was one of the interpretations of defective refractive power of the human eyes is not known.

It is possible that when, more than six hundred years ago, Roger Bacon, after describing the properties of a convex lens, wrote, "and therefore this instrument is useful to the aged and to those having weak eyes, for they can see any letter, howsoever small, of a sufficient magnitude," he may have noted headache as a symptom and tied up his observation in a cipher, as was his

wont. Doubtless the *doctor mirabilis* made the eyes of many a colleague grown old and dim in service see the finest of letters, and relieved the distress of which six centuries before Ætius wrote, but could not explain.

At all events, he recognized asthenopia, although he did not invent this title, which is still in constant use to describe a lot of symptoms, the major ones of which are a sense of strain and weariness in the head and eyes caused by visual effort, especially at close ranges.

At first "this condition was considered as a sort of amblyopia," and in the century prior to Donders' important observations, to use his own words, "neither the nature nor the causes of the phenomena of asthenopia had been fully ascertained, notwithstanding many endeavors to investigate them."

The early writers often recorded an accurate description of asthenopia, but curiously enough, although it must have been observed, headache, as we understand it, is practically never mentioned. "Uneasiness about the forehead" (Taylor's phrase); "tension above the eyes"; or "tension above the eyes which gives place to actual pain," are the expression one finds. But sixty-four years ago, after an elaborate study of this condition, Donders wrote: "Hypermetropia is usually at the bottom of asthenopia. . . . I venture to maintain that in the pure form of asthenopia, hypermetropia is scarcely ever wanting."

It is true, as Donders himself states, that von Graefe was on the point of thinking of hypermetropia in its proper relation to asthenopia, but he didn't quite hit the mark, and to the learned professor of ophthalmology and physiology in Utrecht belongs the credit of revealing the significance of the muscular strain which is occasioned by the hyperopic eye, and of explaining that to this constant muscular effort are due the pain, misery and asthenopia of its subjects and that proper glasses afforded the necessary relief.

After this discovery it was no longer necessary to follow Mackensie's suggestion that as asthenopes "never could employ their eyes advantageously in reading and writing, they might see sufficiently to follow the pastoral pursuits of an Australian colonist."

As time went on, systematic writers established various types of asthenopia, to wit., asthenopia simplex, dolens, cephalalgica irritans, etc., not to mention accomodative, muscular and neurasthenic "weak sight."

Soon the term "eye-strain" came into existence, and now almost universally used, although not quite to the exclusion of "asthenopia," is a term which interprets the varied general and local manifestations of refractive error, exterior ocular muscle imbalance and accommodative dysfunction. The list is a very long one.

With full recognition and admiration of the work of Donders, Graefe and the earlier writers, it is a matter of congratulation that the widespread influence of eye-strain was first recognized by American physicians, and our real knowledge of this matter is due to the genius of Weir Mitchell and the labors of William Thomson and Ezra Dyer. It constitutes a discovery, or at least, a realization which in so far as the relief of human suffering and the sum of human happiness are concerned, deserves to rank with the best scientific announcements of the nineteenth century. Listen to the proclamation of more than fifty years ago:

"(1) What I desire, therefore," wrote Weir Mitchell in 1872, "to make clear to the profession at large is that there are many headaches which are due to the disorders of the refractive or accommodative apparatus of the eyes; (2) that in these instances the brain symptom is often a most prominent and sometimes the sole prominent symptom of the eye troubles, so that while there may be no pain or sense of fatigue in the eye, the strain with which it is used may be interpreted solely by occipital and frontal headaches; (3) that the long continuance of eye troubles may be the unsuspected source of insomnia, vertigo, nausea and general failure of health; (4) that in many cases the eye trouble becomes suddenly mischievous owing to some failure of the general health, or to the increased sensitiveness of the brain from moral or mental cause." We have elaborated our methods, improved our instruments of precision and extended the list of interpretations of eye-strain, but otherwise we have been able to add but little to this complete and compact presentation of the facts of the case.

Of the varied and numerous exhibitions of eye-strain, we are,

as I understand the matter, confining ourselves this evening to one conspicuous symptom, namely, headache.

Frequency. The literature is replete with statistical information relating to the frequency of headache due to ocular defects, and this term includes refractive errors and the various types of heterophoria and abnormal accommodation. It would serve no useful purpose to review the tabulations in this respect. Suffice it to say that from thirty to sixty per cent. of functional headache are wholly or in part due to eye-strain in the widest acceptation of that term.

Whether this refractive error or muscle imbalance is the more potent factor is not determined, or at least, differences of opinion exist. Long ago Weir Mitchell was impressed with the influence of muscle defects, and so good an observer as Marlow believes that heterophoria is more apt to produce headache than ametropia. It is difficult to be exact in these circumstances, as the conditions are almost always in combination, and after all, it makes very little difference, as the careful investigator of the etiology of cephalalgia always takes all factors into consideration.

The type of ametropia and heterophoria in relation to headache. While it is true that any type of refractive error may be the cause of headache, it is well known that simple myopia is least frequently concerned, while astigmatism, with or without hyperopia, most commonly is the causative agent; simple and compound myopic astigmatism holds an intermediate position.

(1) The ophthalmologist is constantly asked this question: "Has my patient enough refractive error to account for headache?" And it is not uncommon to encounter the belief among the laity and among physicians that the refractive anomaly must be considerable before it can provoke head-pain. This is all wrong. Small, very small, degrees of ametropia, especially astigmatism, are frequent headache-producers, more frequent, in fact than the large errors. This fact is worthy of emphasis.

(2) Another important point is this, namely, that ocular headache and pain in the eyes are often unassociated. "Doctor, I am subject to severe headache, but it can't be my eyes, for they never pain, no matter how much nor how long I read," is a sentence that must be familiar to all of us.

Long ago Donders, referring to asthenopia, noted this fact: "It is remarkable," he writes, "that pain in the eyes themselves, even after continued exertion, is of rare occurrence." It is perhaps too much to say that it is "of *rare* occurrence"; but this disassociation is certainly quite common, and often diverts the examiner from the true causes of the headache.

(3) Physical vigor and welfare do not necessarily exempt their possessor from ocular headache, even when the refractive defect is a small one. "It is absurd," says some young Hercules, "to blame my eyes for my frequent headaches; I can see like a hawk and am as strong as an ox." Suspect this patient; examine his eye *secundum artem;* the correction of a fraction of a diopter of astigmatism may be the required therapeutic measure.

(4) On the other hand, and not infrequently, precisely the reverse is true. Weir Mitchell did not miss this point when, fifty-three years ago, he said, "in many cases the eye troubles, *i.e.*, eye-strain, headache, become suddenly mischievous, owing to some failure of general health, or to the increased sensitiveness of the brain from moral or mental causes." The clinical histories of supposed eye-strain patients should always be taken carefully, and often this relationship will be discovered; many of them with acquired lowered resistance in the manner described need treatment and management from the general as well as the ocular standpoint; combined, such treatments may be effective; uncombined, defective.

(5) The statements just made suggest another clinical fact, namely, that many patients have "two or even three kinds" of headache, as Mitchell was wont to say. Not infrequently the subject is able to differentiate them. "The headache I had yesterday," he remarks, "was not from my eyes; I can always know when my eyes are at fault." All this may seem very trivial, and yet I think it is not, even though it is so well known, because disregarding it may readily lead the physician into error, causing him to stray from the proper avenues of therapeutic effort. Naturally, these complex, often recurring headaches may have a much wider significance, which is not now in discussion.

(6) Has eye-strain headache distinctive features? Suggestive they certainly may be, but not pathognomonic. The frontal re-

gion is probably most frequently selected, but the pain may be situated in the temples, the parietal or occipital region, or at the vertex. Briefly, the headache may vary from a moderate frontal distress to violent explosions of pain, and may be localized in any portion of the cranium, and may or may not be associated with nausea and vomiting; a large percentage of the so-called "bilious headaches" are of ocular origin, and the head-pain often is migrainal in type. True migrain, however, is never, I believe, solely due to eye-strain, although this may be, and often is, an important factor in the complex etiology of this disease entity, and the most painstaking and repeated investigation of refractive error and heterophoria is an essential part of its management.

The attempt to classify headaches with relation to their supposed etiology according to their manifestations, is praiseworthy, and much has been written on the subject. But it is not a dependable method of diagnosis, and it is not safe to be satisfied with "he has a typical eye-strain headache," "a characteristic hypertension headache," a "representative gastric headache," a marked "pituitary body headache," etc. Eye-strain is a notable mimic, and constantly originates head-pains which resemble closely those usually ascribed to other causes. This is a rather trite statement, and yet not without its value. The lesson is obvious, and further comment would seem to be unnecessary.

(7) An attempt has been made to differentiate the headache due to refractive error and those caused by heterophoria, for example, accusing errors of refraction of pain in the anterior portions of the cranium and various types of heterophoria, especially anomalies of convergence, of occipital distress. Freely admitting that convergence insufficiency often causes occipital headache, I question whether the distinction just mentioned can be maintained with accuracy.

Of course all types of heterophoria, either alone or associated with refractive error, are headache-producers, and may have favorite areas of the cranium for their activities, for example, the one just named, or the common brow pain above the hyperphoric eye, or the temporal and tempero-parietal aches associated with esophoria, etc. The point simply is that these are often suggestive localizations, but nothing more.

Although the act of reading, or performing any sustained piece of work at close ranges, may cause headache in a few minutes, the pain is often delayed for long periods of time, a common example being the morning headache which follows the evening reading. An interesting eye-strain phenomenon is one which may be called its "cumulative action," perhaps most conspicuously manifested in the freedom from headache during the week's work, but its arrival at the end of this period, the so-called Sunday headache. Probably in minor degree this type of headache is evident at the close of the day's labor. "My head begins to ache about four o'clock each afternoon," is a common statement.

(8) Naturally, the incidence of ocular headache does not depend alone upon eye work at close ranges. Car sickness and headache (even if reading has been omitted), the shopping, cinema, and automobile headaches are in the majority of instances due to eye-strain.

Those which are ascribed to attendance at the theatres, or a motion-picture hall, are especially prone to occur if hyperphoria is associated with refractive error, particularly if the gaze must be directed somewhat upward. This was recognized by the English Commission which investigated the ocular harm caused by the "pictures," as they are colloquially named in Great Britain.

(9) *Contributing Factors.* Mention has been made of the fact that many patients suffer from several kinds of headache, and if therapeutic success is to be achieved, each factor must be eliminated. But many pure eye-strain headaches apparently continue even though the eye faults have been most accurately corrected. The failure of optical therapy in these instances often depends upon the surroundings of the patient during his working hours, and notable contributing factors are glare, imperfect illumination, unhygienic conditions and impure air. Too often the physician disregards this cause, and the patient thinks, or perhaps is encouraged to think, that the "glasses are wrong," to use a common expression. Our duty is not strictly performed unless we ascertain exactly under what conditions the patient is employed. An alteration of illumination, an eye shade, an improvement in ventilation may be all that is required. Glare is a particularly

mischievous factor, and it is popularly believed that irritating rays passing to the retina are blameworthy. In point of fact, the pain it causes is largely, if not entirely, due to periorbital muscular compression, especially against the supraorbital notch; it is really a pressure pain.

Naturally, glare-pain and headache may require the use of variously tinted spectacles, but it would seem their employment is rather overdone, and in this respect eyes are too frequently coddled. In most instances the tinted lenses should be worn when the need is evident, but in usual circumstances the ordinary glasses be employed. Exclusive of glare, "the blessing of the sunlight" should not be disregarded. It is easy to create an undue sensitiveness to ordinary light, which has not previously existed.

Often headache is the only interpretation of eye-strain, but not infrequently, as already noted, it is only one of the causes, that is, the patient is the subject of several kinds of head-pain, depending upon other etiologic factors, organic and otherwise.

But ocular headache may be, and not uncommonly is, only one link in the chain of the so-called eye-strain reflexes. Excluding the usual local manifestations, to wit., blepharospasm, conjunctival congestions, blepharitis, styes, chalazia, etc., we recognize eccentric poses of the head, distortion of the features, especially wrinkling of the forehead, contraction of the sternoclinomastoid, and tilting of one or other shoulder; even lateral curvature of the spine. In the latter circumstances, various types of heterophoria, notably hyperphoria and anomalies of the action of the obliques, maintain conspicuous import.

Finally comes the long list of all manner of reflex disturbances: vertigo, one variety being characterized by a sense of falling forward when walking in a crowd, associated with confusion of ideas; drowsiness, and, on the other hand, insomnia, timidity, night terrors and evil dreams; pseudo-chorea, habit-spasm, epileptiform convulsions, melancholia and neurasthenia; flatulent and other types of dyspepsia; indigestion and constipation; pains strangely and persistently situated in the nape of the neck, between the shoulder-blades, in the precordium, at the end of the spine, and deep in the mastoid. This category could easily be

enlarged; this record is sufficient and serves its purpose to indicate that many symptoms, apparently totally unrelated to the eyes, may none the less be the result of eye-strain, and be associated, as has been said, with the headaches which are now chiefly in consideration.

Fully aware that such phenomena, headache and the conditions which have been catalogued, are frequently due to causes other than ocular strain, earnestly deprecating incomplete investigation from all standpoints, and entirely conscious of the fact that the whole matter has not always escaped exaggeration, it is definitely the duty of physicians to recognize the relation of eye-strain to all of these and allied phenomena, and to eliminate it as an etiologic factor. In summary, then, these are the facts:

Eye-strain due to refractive error, heterophoria and accommodative dysfunction is responsible, in whole or in part, for about 60 per cent. of functional headaches; small errors of refraction are often more potent in this respect than the larger ones; all types of refractive anomalies and heterophoria are capable of causing headache; but in the list of errors of refraction, simple and compound astigmatism and hyperopia are the most potent; the eyes themselves may be free from pain, and the headache none the less be ocular in origin; physical vigor does not exempt the patient from ocular headache, although often such headaches do not appear until physical and mental power fail; there are no pathognomonic features of eye headache; they may be suggestive, not more; they may be situated in any portion of the cranium and be of any degree of intensity, and may closely resemble those usually ascribed to other causes; they may immediately follow eye effort, or be apparent only long after the ocular work is completed; eye work at close ranges is not a *sine qua non* of their development; long distance ocular effort may be equally effective; ocular headaches may be acute, sometimes chronic, but chronicity is usually suggestive of some other factor, direct or contributing; there may be recurrences of periodic eye headache, which appear at times to exercise a certain quality of selection with respect to its "agent provocateur," thus, for example, writing may be pursued with impunity, but reading invariably and quickly produce head-pain, moreover, in exactly similar circumstances.

The cure of eye-strain headache depends in largest measure on the measurement and adjustment of suitable lenses. The correction of errors of refraction and muscle balance is an art and a science. It must never be slovenly, never careless. To fail in these respects is just as reprehensible as would be the administration of wrong doses of a remedial agent, or faults in the technic of a delicate surgical operation. We are not, however, discussing treatment, as I understand it, this evening; also this largely concerns the conscience and work of the ophthalmologist.

But with the expression of one thought I desire to close this paper, which naturally has dealt in homely phraseology, only with the repetition of well-known facts and the record of universal experience and observation, to wit., that in many of the eye-strain problems the general physician and those trained along special lines should work together to the same end, exactly as they do in many diseases of the eyes. Such "eye-strain problems" may be complex; if so, cooperation is the master word. Therapeutic success is what we desire; we shall achieve it in complicated circumstances if we labor, to use Ruskin's oft-quoted words, "in perfect sympathy and uncontending equity."

HEADACHE FROM THE VIEWPOINT OF THE INTERNIST

LUDWIG KAST

(Delivered before the New York Academy of Medicine, March 19, 1925)

Until the different mechanisms producing headaches are all known it is impossible to give an etiological or pathological classification of them. From the internist point of view it is therefore still necessary to resort to clinical classifications in order to get some order into the great varieties of headaches.

Eliminating from discussion headaches due to *trauma* and simple *symptomatic*, transitory headaches which accompany acute fevers (scarlet fever, measles, influenza, pneumonia, typhoid, malaria, erisypelas, acute indigestion, etc.), all others may be divided into extracranial and intracranial.

The *extracranial* forms originate in disturbances of eye, ear, nose, throat, sinuses, teeth, jaw, periost or muscles of the skull; special mention should be made of one form of headache originating in the occipital muscles and their insertions, often associated with gouty or so-called rheumatic tendencies caused by myositis and often accompanied by palpable nodules in the muscles or connective tissues. This form has to many patients a sense-quality of an internal headache and is not relieved if treated as such.

The *intracranial* headaches may be subdivided as follows:

Reflectory headache caused by extracranial disturbance like eyestrain, unerupted wisdom teeth, gastric hyperacidity or constipation. The latter causes often toxic headaches, but, besides, constipation in some patients causes reflectory headache which disappears immediately upon proper intestinal action, too quickly to be possibly due to toxines in the circulating blood.

Circulatory headaches occur in certain individuals if they breathe bad air or get overheated. The exact mechanism of this headache is unknown, but in all probability is a form of intracranial congestion. That congestion will produce headaches seems proved by the following observations: inhalation of amyl nitrate, causing vaso-dilation followed by a throbbing, full feeling in the head, in many patients will produce a distinct transitory headache. Headaches occur after severe coughing spells (in whooping cough) or in passive hyperemias such as in cases of heart and lung diseases. Patients who are inclined to headaches nearly always notice an increase of pain when stooping down or lying down with the head low. A nose bleed often relieves headache promptly.

Anaemia of the brain will often cause headache, as it occurs from hemorrhage or through vaso-motor disturbances producing transitory acute brain anaemia. It is noteworthy, many patients suffering with chronic anaemia have more headaches when in erect position and less headaches when lying down. It is probable that many cases of so-called emotional headaches are partly due to intracranial vaso-motor changes.

Toxic headaches are frequently caused by alcohol, nicotine, coffee, tea. An interesting form of transitory toxic headache is produced in some patients by certain medications such as iron, strychnine, iodine.

Focal infections anywhere, particularly in tonsils, bile ducts and intestines, often may cause headaches.

A severe toxic form occurs in uremic poisoning and eclampsia. It deserves emphasis that long before a uremic attack occurs there are often headaches, especially in the morning, which belong to the preuremic phase of kidney insufficiency. These cases need study of their blood chemistry.

Similar developments are observed in diabetes where premonitory headaches foretell the approach of a coma.

Gouty patients often suffer with headaches but many patients suffering with typical gout will be conspicuously free from headaches. We must bear in mind that many patients are labeled "gouty" who really do not have any traceable disturbance of their uric acid metabolism but show such changes in joints, muscles and nerves as form part of a general "rheumatic" disturbance. Chemical blood examination, intestinal hygiene, and search for primary foci are of great importance.

Arteriosclerosis of the brain often produces very severe attacks and persistent headaches aside from the dull diffuse pain which accompanies the so-called neurasthenic phase of early cerebral angiosclerosis. The combination of disturbed sleep, increased fatiguability, slight headaches toward evening and indigestion is not infrequently the first phase of cerebral sclerosis.

No doubt some of the very severe attacks of headaches (occasionally of migraine character) which occur before a transitory or lasting hemiplegia are of angiospastic type.

A complicated problem is the so-called "bilious headache." The term bilious headache is old and persistent, though it has no scientific standing. What is generally meant by it is a headache which is the result of some sort of indigestion involving bile disturbance. No doubt there are disturbances of digestion which lead to headaches.

In some cases there are definite relations between certain food and headaches. In others it is a chronic putrefaction or fermentation of the intestines, but in the majority of cases the so-called "bilious headaches" are a form of migraine.

Migraine is a form of intracranial headache which may be due to a variety of etiological factors, the characteristic feature of it lies seemingly in the mechanism producing it. From our study

of a large number of migraine patients, we believe that the great majority of cases of migraine are of pituitary origin as suggested by Deyl twenty-five years ago. The exact mechanism of the attack is not known yet, but includes probably acute enlargement of one or both lobes of the pituitary. The constitutional tendency to migraine is represented in a peculiar anatomical relationship of the pituitary gland to its bony container and adjacent tissues, and in a peculiar rôle which the pituitary gland plays in that individual in the adjustment of endocrine disturbances. The acute attack of migraine would therefore be a "pituitary crisis" consisting partly in its mechanical enlargement and partly in changes of its function involving adjacent tissues, as well as those tissues in the body which the pituitary secretions usually influence. The arguments for a pituitary type of migraine are as follows:

1. They usually develop at puberty and usually end at change of life. They are preceded in childhood and followed in old age by atypical forms of crises which have all the earmarks of endocrine dysfunctions.

2. There is a conspicuous relationship between attacks of migraine and the ovarian (menstrual) cycle.

3. The overwhelming majority of patients suffering with migraine show other disturbances closely identified with endocrine malfunction.

4. A very large number of migraine patients show a small sella turcica.

5. They respond very often to treatment directed toward a relief of increased pituitary function, for instance, small doses of pituitary extract or ovarian extract preceding menstruation; or thyroid medication in migraine patients with hypothyroidism.

6. A migraine attack increases in frequency and in intensity in proportion to factors which make a demand upon the pituitary function, such as muscular and mental exertion, sleeplessness, and emotional strain.

Dr. de Schweinitz has offered probably the most valuable contribution of the last twenty years to a better knowledge of migraine by showing the variable relationship between the pituitary and the optic nerves and the variable relationship between the gland and other adjacent tissues. Migraine is bound to be

different in its symptoms depending upon the different anatomical relationship of the pituitary gland in the individual case.

That the pituitary gland changes its size cannot surprise us. We know that other endocrine glands vary in size, for instance, the premenstrual swelling of the normal thyroid in women.

No man seems immune to headache. Probably even those who never have had headache would get it under certain conditions, but in migraine patients the threshold is lowered to the effects of emotional strain, and to toxines such as fatigue, tea, coffee, alcohol, nicotine, and others. Unless one accustoms oneself to interpret fatigue as the expression of toxines one loses many opportunities for effective treatment. Fatigue, physical as well as mental, plays a very great, if not the most important rôle in patients with frequent attacks of migraine. At times patients are continuously on the verge of a headache, a condition similar to the "status epilepticus." This state of continuous headaches is always associated with a state of profound general exhaustion of the patient. He not only gets tired upon slightest effort, but once tired he cannot get over the fatigue, and the more tired he is the less he can rest and the less he can sleep.

Patients who suffer with typical migraine often have atypical attacks in between, or mild abortive attacks in which the symptoms may not reach a full development. In fact there are, unquestionably, attacks in some patients in which the headache itself is almost entirely missing. These abortive or atypical forms of migraine are often interpreted as primary digestive disturbances, and might be called migraine equivalents, such as attacks of anorexia with diarrhea or attacks of frequent extra-systolic contractions of the heart, or attacks of polyuria all of which are evidently caused by the same mechanism which, if more fully developed, would bring on a typical attack of migraine. In this connection it seems very interesting to note that many patients who have more or less typical attacks of migraine from puberty until climacterium have had peculiar attacks in childhood of fatigue, depression, irritability, nausea, and sometimes severe vomiting but with very little or no headaches. Many of these attacks are interpreted as so-called acidosis. Later on at puberty these attacks disappear and give place to typical migraine, and it is equally interesting that after the climacterium such patients

will have migraine—equivalents manifested by depression, disturbed sleep, irritability, "poison feeling," polyuria, indigestion, and nausea sometimes lasting for two or three days before the headache makes it appearance and sometimes the headache is only so mild that it is interpreted as a result of the preceding indigestion. It appears that the severe and snappy attacks of migraine between the ages of fifteen and fifty are often preceded in childhood by so-called attacks of acidosis and are followed by the post-climacteric prolonged and flattened spells of depression, etc.

Among the many plans of treatment of migraine best results come from an improvement of the general "tone" of the patient.

Elimination of foci of infections, study of blood chemistry, attention to intestinal hygiene, outdoor life, sufficient exercise but not to the point of fatigue, proper eye glasses and avoidance of eyestrain, sufficient sleep, hydrotherapy, small doses of luminol (1/6 of a grain), raising the blood pressure if low, small doses of pituitary extract (1/16 grain gradually increasing), and other adjustments of glandular dysfunction are the essential directions.

The very encouraging reports published some time ago on hypodermic peptone injections for the cure of migraine we have not been able to verify.

It is an interesting observation that some patients with migraine-tendency are very sensitive to sunlight; exposure of their head even for a few minutes or a general sun bath will bring on attacks with unfailing regularity. These cases usually have low calcium content of the blood and at least in one case a surprising improvement was brought about by intravenous administration of calcium.

The acute attacks of migraine vary so much in their responsiveness to medication and other forms of therapy that patients themselves usually know best what will relieve their individual attack. In our experience phenacatin, acetanilid and caffein seemed to be the most efficient combinations; the addition of aspirin and small doses of codein will often improve the effect of this combination.

The intramuscular use of lutein has been suggested for acute attacks but has not proved of particular value in our experience.

Structural intracranial changes very frequently are the cause of the most severe forms of headache. Neoplasms, tumors such as tubercle, syphilis, infections of the meningi, form a group by themselves belonging to the domain of neurology.

The most difficult problems offer those forms of headache which are on the border line of the neurologist and internist, where neurological and digestive or metabolism disturbances play into each other. To this group belong the so-called neurasthenic headaches which seem to be a disturbance of some intracranial mechanism, and for which adequate physical explanation will be found. There are psychological features in these symptom complexes no doubt, but in most cases there are also definite physical disturbances and a correction of body chemistry usually improves the so-called neurasthenic headache and facilitates psychotherapy.

This resume of headaches from the internist point of view necessarily leaves out several forms of headaches and makes no claim for a complete classification.

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PUBLIC HEALTH COMMITTEE

Report on the Indiscriminate Use of X-rays in the Treatment of Hypertrichosis

A committee appointed by the Section on Dermatology and Syphilis of the Academy, to investigate and report on the best means of suppressing the indiscriminate use of X-rays in the treatment of hypertrichosis by commercial institutes of unethical standing, submitted the following description of the situation.

1. Hypertrichosis (superfluous hairs) upon the face, arms, legs, and axillae, is a common dermatological condition for which relief is sought, mostly by women from twenty to thirty years of age. The accepted method of treatment by the members of the Section and by recognized dermatologists in Europe and America is by electrolysis (the electric needle).

This is tedious, slightly painful, slow, but good results are secured by patient, persistent, careful treatment, with no harmful effects upon the skin.

2. It is the unanimous opinion of the members of the Section that X-rays in the treatment of hypertrichosis are dangerous, and constitute an improper method of treatment, entailing great hazards to the patient. These hazards are slow to manifest themselves, not beginning to appear for one and a half to two

years after treatment, and gradually tending to become worse thereafter. They begin as telangiectases, and parchment-like atrophy, and later may go on to keratoses, and malignancy.

3. The members of the Section and the recognized dermatologists of the world, in view of these dangers, do not use X-rays in the treatment of hypertrichosis, or recommend them for this purpose, except as an experimental dangerous method to be used perhaps occasionally in unusually severe cases. In fact, X-rays are not generally used at all for this purpose.

4. During the past year, the members of the Section have seen in private practice and in the meetings of dermatological societies and the Section meetings of the Academy, several patients who presented X-ray burns and who said they had been treated with X-rays for hypertrichosis of the face by institutes well known to the public through widespread advertising. Usually the entire bearded area was affected by parchment-paper like atrophy, wrinkles, scarring and telangiectases, and a few cases presented keratoses. These patients had all been treated recently and so it was too early for malignant changes to manifest themselves. It is our belief that at least ten or twelve such cases have been seen by us during the past year.

5. These cases all reported that they had been promised complete cures with no harmful effects upon the skin, and had been persuaded by the advertising literature and the promises given them verbally by these institutes that no dangers, scarring or harmful effects would result, to pay various sums of money, some of them as high as $1,500 for the treatment, and to undergo the treatment, with resulting permanent and hazardous disfigurement.

6. It is the impression of the committee that most of these women are working women, without much money, without any knowledge of X-rays or judgment concerning their uses and dangers.

7. Appended hereto are excerpts from the advertisements of these institutes, and from the standard text-books of recognized dermatologists, showing that the advertisements are misleading because the authors are incompletely quoted. The attached letter was written to the dermatologists mentioned as recom-

mending the treatment and requested an opinion from them on the literature, which replies are enclosed to supplement this report. Under assumed names, members of the committee have also visited personally the institutes and were handed this literature and verbally reassured that the method is harmless to the skin, and that no harm in any way ever results from it.

COMMITTEE ON MEDICAL EDUCATION

Opportunities for Graduate Medical Study in New York

The Committee on Medical Education has prepared a series of synopses of approved opportunities for graduate medical study in New York City which have just been published for distribution. The synopses cover dermatology and syphilology, obstetrics and gynecology, internal medicine, ophthalmology, otolaryngology, pediatrics, surgery, and urology. Synopses to include neurology and psychiatry, orthopedic surgery, and medical science subjects are in course of preparation.

A Bureau of Clinical Information is maintained at the Academy where detailed information is available regarding opportunties for graduate medical study in New York, and also in other cities of the United States and abroad. The Executive Secretary in charge of the Bureau is prepared to answer inquiries concerning ordinary internships, special internships, or residencies, graduate courses in medical schools and teaching hospitals, and extension courses. Much information in regard to graduate medical work in England and on the Continent is on file.

The Bureau publishes a Daily Bulletin of Surgical Clinics which will be mailed free to visiting doctors on request. A Weekly Bulletin of Medical Clinics also is published. A book of the fixed clinics of Greater New York, with a transportation guide, has been prepared for the use of visitors whose stay in the city is limited, and is furnished without charge.

PROGRAMS OF STATED MEETINGS

In the March number of the Bulletin there appeared the scientific programs arranged for the Stated Meetings of the Academy of March 5th, March 19th, and April 2nd.

The programs of the concluding meetings of the season are as follows:

April 16th

Program arranged in cooperation with the Section of Neurology and Psychiatry.

a. The ultimate cause of most hemiplegias.

THOMAS F. REILLY

b. The proper classification of the cerebral palsies of early life.

BERNARD SACHS

c. The static and kinetic representations of the efferent nervous system in the psychic sphere.

J. RAMSAY HUNT

May 7th

Program arranged in cooperation with the Department of Medicine, New York Post Graduate Medical School.

a. *Alkalosis.*

1. Chemical Studies.

JOHN A. KILLIAN, Ph.D.

2. Clinical discussion of cases. (Lantern Slides.)

ARTHUR F. CHACE

b. The clinical value of recent tests for liver function.

HOWARD F. SHATTUCK

c. Blood sugar curves in the diagnosis of diabetes.

HERMAN O. MOSENTHAL

May 21st

Program presented by the Department of Metabolism of the Vanderbilt Clinic.

a. The application of newer methods in blood-chemistry to clinical medicine.

F. RENEE WIENER

b. Iodine in the treatment of diseases of the thyroid gland.
HENRY E. MARKS

c. The mechanism of insulin action.
ERNST FRIEDRICH MULLER (Germany)
HERBERT J. WIENER

The following regulations for the stated meetings have been adopted by the Council of the Academy:

1. All papers to be limited to thirty minutes. If longer time is needed for protocols or experiments, summaries only shall be read. (A lantern is always available.)
2. All papers to be typewritten and also a summary to be prepared.
3. The Academy reserves the right to publish the complete paper or a summary of it in the monthly Bulletin of the Academy. This regulation may be waived in case arrangements for publication have been made by the speaker prior to his acceptance of the invitation.

BEGINNING WORK ON THE NEW BUILDING

On May 5 the contract for the excavation of the new Academy building site was awarded to the Thomas Crimmins Contracting Company. Work was begun on May 7 and is progressing rapidly.

The services of Mr. Barnet Phillips have been secured for the purpose of aiding the architect and the Academy in decorating and equipping the new building.

ORGANIZATIONS WHICH MEET AT THE NEW YORK ACADEMY OF MEDICINE

American Association for Regional Anesthesia.
American Heart Association.
American Proctologic Society.
American Rehabilitation Committee.

American Society for the Control of Cancer.
American Society of Hospital Social Workers.
American Stomatological Society.
American Urological Association, New York Society.
Associated Out-Patient Clinics.
Association of Dental Nurses.
Association of Italian Physicians of America.
Association for the Prevention and Relief of Heart Disease.
Association of Tuberculosis Clinics.
Bronx County Medical Society.
Bronx Pediatric Society.
Bronx Surgical Society.
Chayes Dental Club.
Childrens' Welfare Association.
Committee on Maternal Health.
Committee on Narcotic Drugs.
Cornell Medical Alumni.
The Cosmos Clinical Society.
Dental Hygienists' Association of New York City.
Eastern Medical Society of the City of New York.
East Harlem Health Center.
First District Dental Society, General and Sections.
German Medical Society.
Good Samaritan Dispensary.
Harlem Medical Association.
The Harvey Society.
Hospital Social Service Association of New York City.
Hunterian Medical Society.
Italian Medical Society.
Manhattan Dermatological Society.
Medical Association of the Greater City of New York.
Medical Officers of the 77th Division.
Medical Society of the Borough of Bronx.
Medical Society of the County of New York.
Mental Hygiene Council.
Metropolitan Division of Bureau of Animal Industry Veterinarians.
Metropolitan Medical Society.

New York Academy of Dentistry.
New York City Veterinary Medical Association.
New York Dermatological Society.
New York Electrotherapeutic Society.
New York Heart Association.
New York Neurological Society.
New York Odontological Society.
New York Pathological Society.
New York Roentgen Society.
New York Society for Anesthetists.
New York Society for Clinical Psychiatry.
New York Society of Graduates in Medical Gymnastics and Massage.
New York Society of Thoracic Surgery.
New York State Board of Medical Examiners.
New York Surgical Society.
New York Tuberculosis Association.
Phi Delta Epsilon Fraternity.
Riverside Medical Society of the City of New York.
Society of Medical Jurisprudence.
Womens' Medical Association of New York City.

DEATHS OF FELLOWS OF THE ACADEMY

LeRoy Broun, 148 West 77th Street, New York City; born in Hanover, Hanover Co., Virginia, August 2, 1860; graduated from Vanderbilt University, Nashville, Tennessee, in 1887; elected a Fellow of the Academy April 7, 1892; died April 22, 1925. Dr. Broun was a Fellow of the American Medical Association, a Fellow of the American College of Surgeons, member of the American Gynecological Society, American Society for the Control of Cancer, New York Obstetrical Society; and was consulting surgeon at Women's Hospital and the Manhattan State Hospital.

Edward L'Hommedieu McGinnis, 202 West 86th Street, New York City; born in Alabama in 1862; graduated from the Long Island College Hospital, 1883; elected a Fellow of the Academy

February 5, 1891; died April 28, 1925. Dr. McGinnis was a Fellow of the American Medical Association, the New York Obstetrical Society, member of the alumni society of the Women's Hospital; and consulting electro-therapist at Women's Hospital, Manhattan State Hospital and East Hospital.

REGULATIONS GOVERNING DONATIONS TO THE LIBRARY FUNDS

Donations and bequests are solicited by The New York Academy of Medicine for the maintenance and expansion of the Library.

A donation or bequest of $5,000 or more will provide for a special library fund, the income of which may be used for the general purposes of the Library or restricted to the purchase of books and periodicals, as the donor or testator may indicate. When so restricted, a special bookplate will be used. A donation or bequest of less than $5,000 but more than $1,000 will provide for a named library fund, the income of which will be used for general library purposes or restricted for the purchase of books and periodicals, as desired by the donor or testator.

Donations of less than $1,000 will be added to the general library funds.

FORM FOR BEQUESTS

The following is a brief legal form as a suggestion under which bequests may be made in behalf of the Academy:

I give, devise and bequeath unto "The New York Academy of Medicine" of the City of New York, State of New York, a corporation duly incorporated by the Legislature of the State of New York by an act, entitled "An act to incorporate The New York Academy of Medicine," passed June 23, 1851, and amended June 4, 1853, and June 2, 1877 .....

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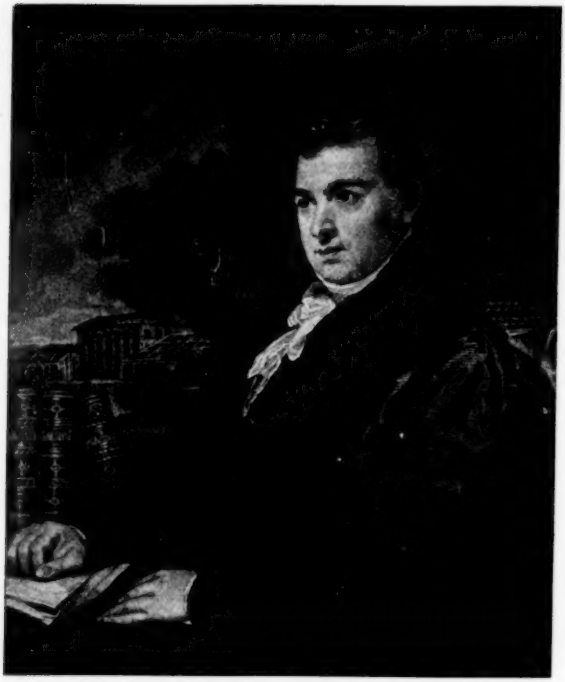

DAVID HOSACK, M.D.

1769-1835

(From a painting by Sully, engraved by Chas. Heath, in "Lives of Eminent American Physicians and Surgeons of the XIXth Century," ed. by Dr. Samuel Gross- Phila.: Lindsay & Blakiston, 1861.)